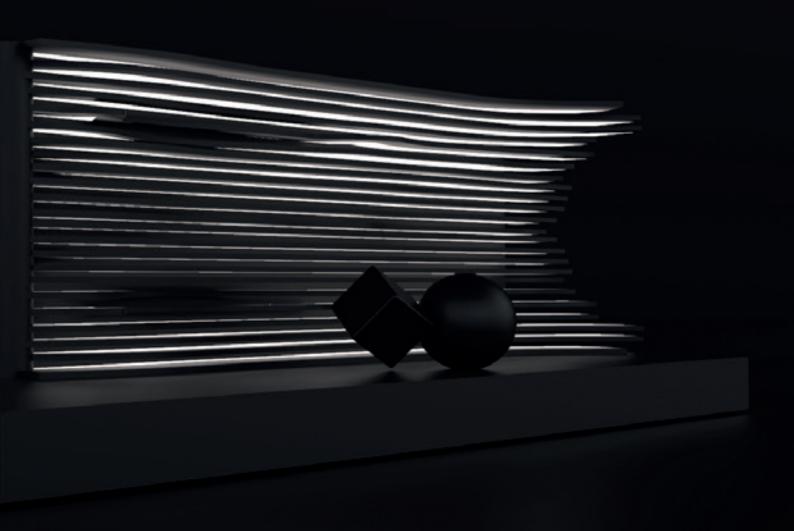
Makrolon® for LED Lighting





LED Portfolio





p. 1	Introducing Makrolon® Polycarbonate	
p. 3	Transparent	
p. 7	Diffusion Quality	
p. 11	Flame Retardant	
p. 15	Reflective White	
p. 19	Thermal Conductive	
p. 23	Edge Light Technology	
p. 27	About Us	

Introducing

Makrolon® Polycarbonate

A Building Block for Innovation

A thermoplastic with truly diverse applications, Makrolon® polycarbonate enables efficient design and manufacturing of optical parts for LED powered luminaires. The tailored portfolio of Makrolon® from Covestro for general lighting applications include transparent, translucent, reflective white, thermal conductive and flame retardant grades, which can be used for injection molding and extrusion. Stronger and lighter than glass, polycarbonate also provides energy and CO₂ emission savings. All of which explains why Makrolon® has been trusted for decades and continues to pave the way for tomorrow's lighting innovations.

Product List

Makrolon®

Transparent Polycarbonate

LED5102

Low viscosity

LED5202

Medium viscosity

LED5302

High viscosity

LED5402

High viscosity

Makrolon®

Diffusion Quality

DQ5122

Low diffusion

DQ5142

Medium diffusion

DQ5162

High diffusion

DQ5622 ET

Extrusion Low diffusion

DQ5652 ET

Extrusion Medium diffusion

DQ5662 ET

Extrusion High diffusion

Makrolon®

Flame Retardant

LED5902 FR

High transmission

DQ5922 FR

Low diffusion

DQ5942 FR

Medium diffusion

DQ5962 FR

High diffusion



Makrolon®

Reflective White

RW5181 019900

Excellent reflection

RW2407 012363

High reflection

RW6267X 012363

High reflection Flame retardant

RW2407 012612

Light blocking

RW6267X 010083

Light blocking Flame Retardant

RW3137 ET 010083

Light blocking Extrusion



Makrolon®

Thermal Conductive

TC629

Excellent thermal conductivity
High softening temperature

TC621

Excellent thermal conductivity

TC421

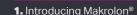
High thermal conductivity

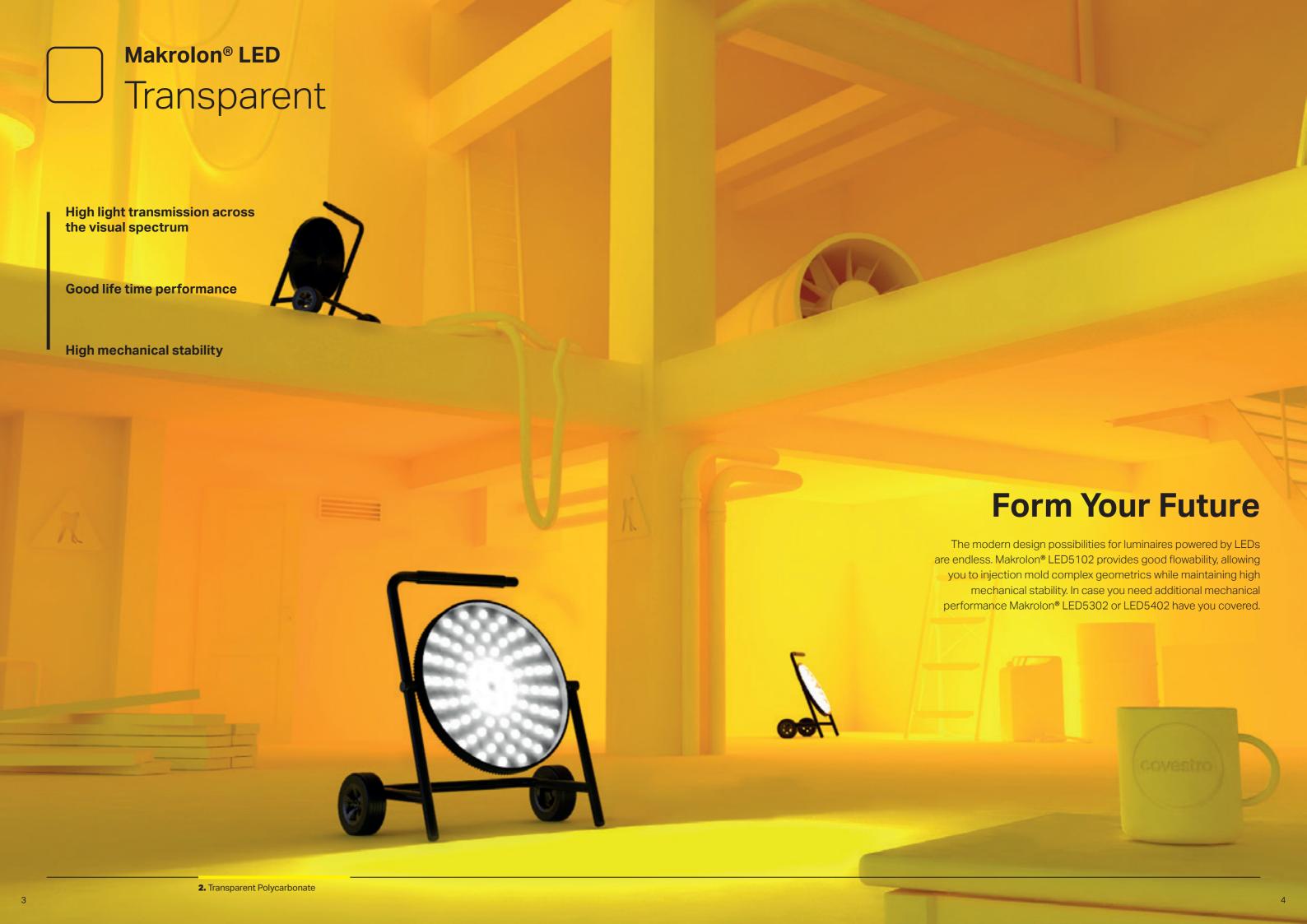
TC210

Electrically insulating Increased thermal conductivity

TC110

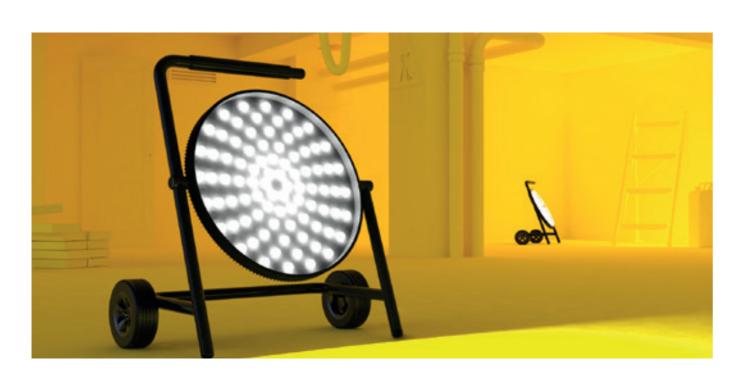
Electrically insulating

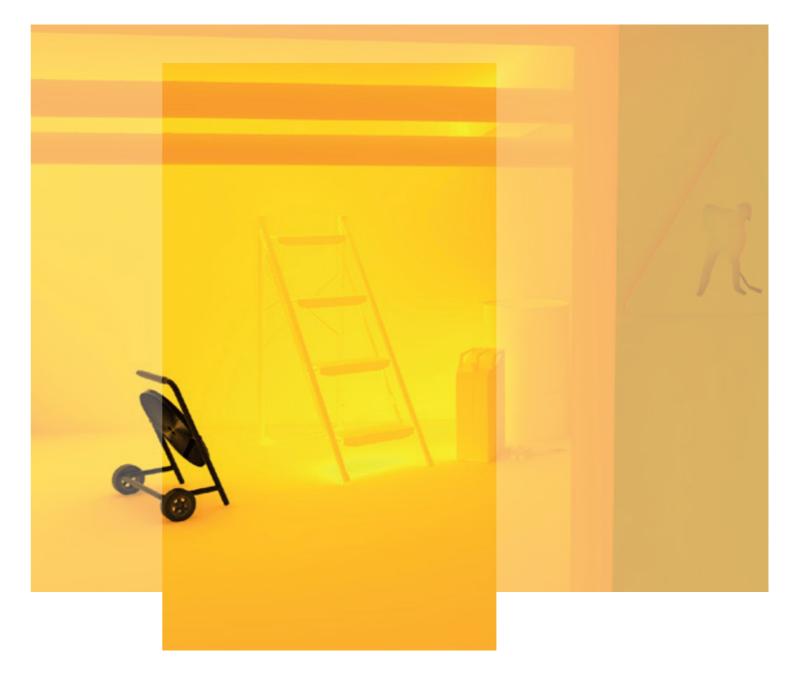




Makrolon® LED Transparent

Material Properties	Makrolon® LED5102	Makrolon® LED5202	Makrolon® LED5302	Makrolon [©] LED5402
MVR [cm³/10 min]	34	19	13	9.5
Transmission @ 2 mm	90%	90%	90%	89%
UV stabilized	v	((•
Yellowness Index @ 2 mm	1	1	1	<0.8
Haze @ 2 mm	<0.5%	<0.5%	<0.5%	<1.0%
Izod notched impact 23 °C [kJ/m²]	55	69	72	71
RTI listed 125°C/115°C/125°C	((1)	(1)	J
f1 listed	(()	(/)	J
Process	Injection molding	Injection molding	Injection molding	Injection molding & Extrusion





Shine Brighter

The incredible transparent properties of Makrolon® LED5102, Makrolon® LED5202, Makrolon® LED5302 and Makrolon® LED5402 let your light shine brighter through both quality and longevity.





Makrolon® DQ Diffusion Quality

Material Properties	Makrolon® DQ5122	Makrolon [®] DQ5142	Makrolon® DQ5162	Makrolon [®] DQ5622 ET	Makrolon® DQ5652 ET	Makrolon [®] DQ5662 ET
MVR (cm³/10min)	34	34	34	6	6	6
HPA* @ 2 mm	19°	43°	56°	19°	49°	54°
Transmission @ 2 mm	85%	65%	57%	83%	58%	54%
UV stabilized	((/)	(((J
RTI listed 125 °C/115 °C/125 °C	(((((y)	J
f1 listed	(()	(((y)	J
Process	Injection molding	Injection molding	Injection molding	Extrusion	Extrusion	Extrusion

^{*} Half power angle





Three Grades - Tailored Power

Makrolon® DQ comprises 3 products for each processing method with tailored half power angles, offering you the right hiding power for your luminaires. Optimized by data science, we can push light transmission to be best in class.



Excellent optical performance

Available in transparent and translucent

Strong flame retardance V0 / 5VA





Makrolon® FR

Flame Retardant

Material Properties	Makrolon® LED5902 FR	Makrolon® DQ5922 FR		
UL94 Classification	V-0 @ 1 mm 5VA @ 3 mm	V-0 @ 0.8 mm 5VA @ 3 mm	V-0 @ 0.8 mm 5VA @ 3 mm	V-0 @ 0.8 mm 5VA @ 3 mm
Transmission @ 2 mm	89%	77%	64%	55%
HPA* @ 2 mm		19°	43°	56°
UV stabilized	•	v	•	J
Yellowness Index	1.2			
f1 listed	•	•	(y)	v
Haze @ 2 mm	<1%			
Process	Injection molding & Extrusion	Injection molding & Extrusion	Injection molding & Extrusion	Injection molding & Extrusion

^{*}Half power angle

Don't Learn Safety by Accident.

Being both temperature resistant and capable of high impact strength, Flame Retardant Makrolon® is a perfect option for light and safety in enclosed spaces with strict safety regulations.



4. Flame Retardant

13



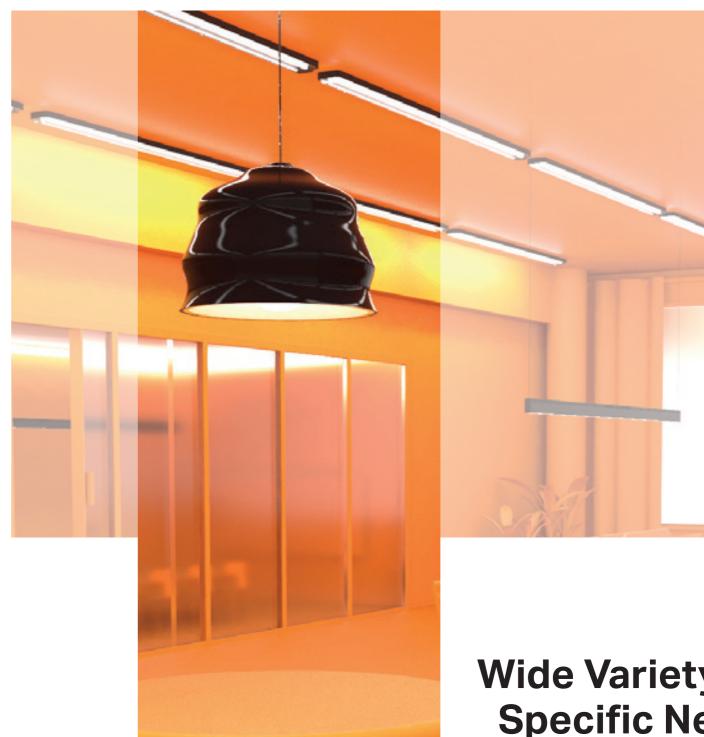


Makrolon® RW Reflective White

Material Properties	Makrolon [®] RW5181 019900	Makrolon® RW2407 012363**	Makrolon® RW6267X 012363**	Makrolon® RW2407 012612	Makrolon® RW6267X 010083	Makrolon® RW3137 ET 010083
Total light reflection @ 2 mm	97%	96%	96%	86%	92%	92%
MVR [cm³/10 min]	26	19	19	19	19	6
UV stabilized	-	/ *	J *	J *	J *	v
Light blocking Transmission @ 1 mm <0.01%	-	-	-	((1)	J
UL94 Classification	V-2 @ 1.5 mm	V-2 @ 1.5 mm	V-0 @ 1.5 mm	V-2 @ 1.5 mm	V-0 @ 1.5 mm	НВ
Process	Injection molding	Injection molding	Injection molding	Injection molding	Injection molding	Extrusion

^{*} Also available as non UV stabilized version (Makrolon® RW2405; Makrolon® RW6265X)





Wide Variety for **Specific Needs**

Makrolon® RW grades are optimized to achieve excellent optical performance without compromise in processability, flame retardance and mechanical performance. The effect of light leakage in reflectors with thin wall thicknesses can be managed by dedicated light blocking products.

^{**} Also available with colder white impression (Color code: 010226)



Reduces weight

Strong heat transferring capability

High level of design freedom:

Innovative Freedom

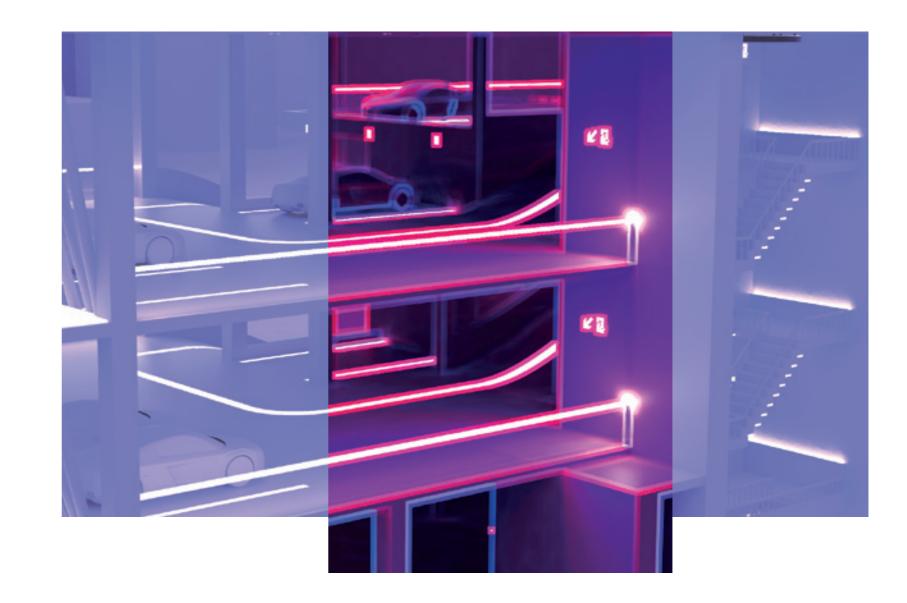
The Makrolon® TC grades provide you the opportunity to replace metals in heat sink applications, opening up incredible design opportunities while still keeping high dimensional stability.

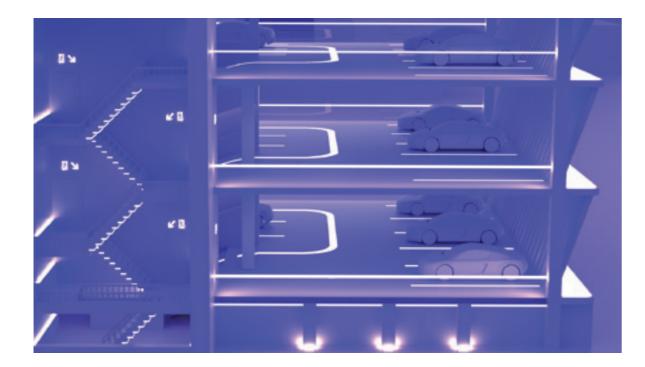


Makrolon® TC

Thermal Conductive

Material Properties	Makrolon® TC629	Makrolon® TC621	Makrolon [®] TC421	Makrolon [®] TC210	Makrolon® TC110
Thermal conductivity in plane [W/(m·K)]	15	16	8	1.4	1
Thermal conductivity through plane [W/(m·K)]	1.2	1.4	0.9	0.3	0.3
Vicat softening temperature	144 °C	128 °C	131°C	146°C	145°C
Electrical properties	Cond.	Cond.	Cond.	Insul.	Insul.
Color appearance					
UL94 Classification	V-0 @ 2 mm	V-0 @ 2 mm	V-0 @ 3 mm	-	-
Charpy unnotched impact 23 °C [kJ/m²]	<10	<10	<10	12	70





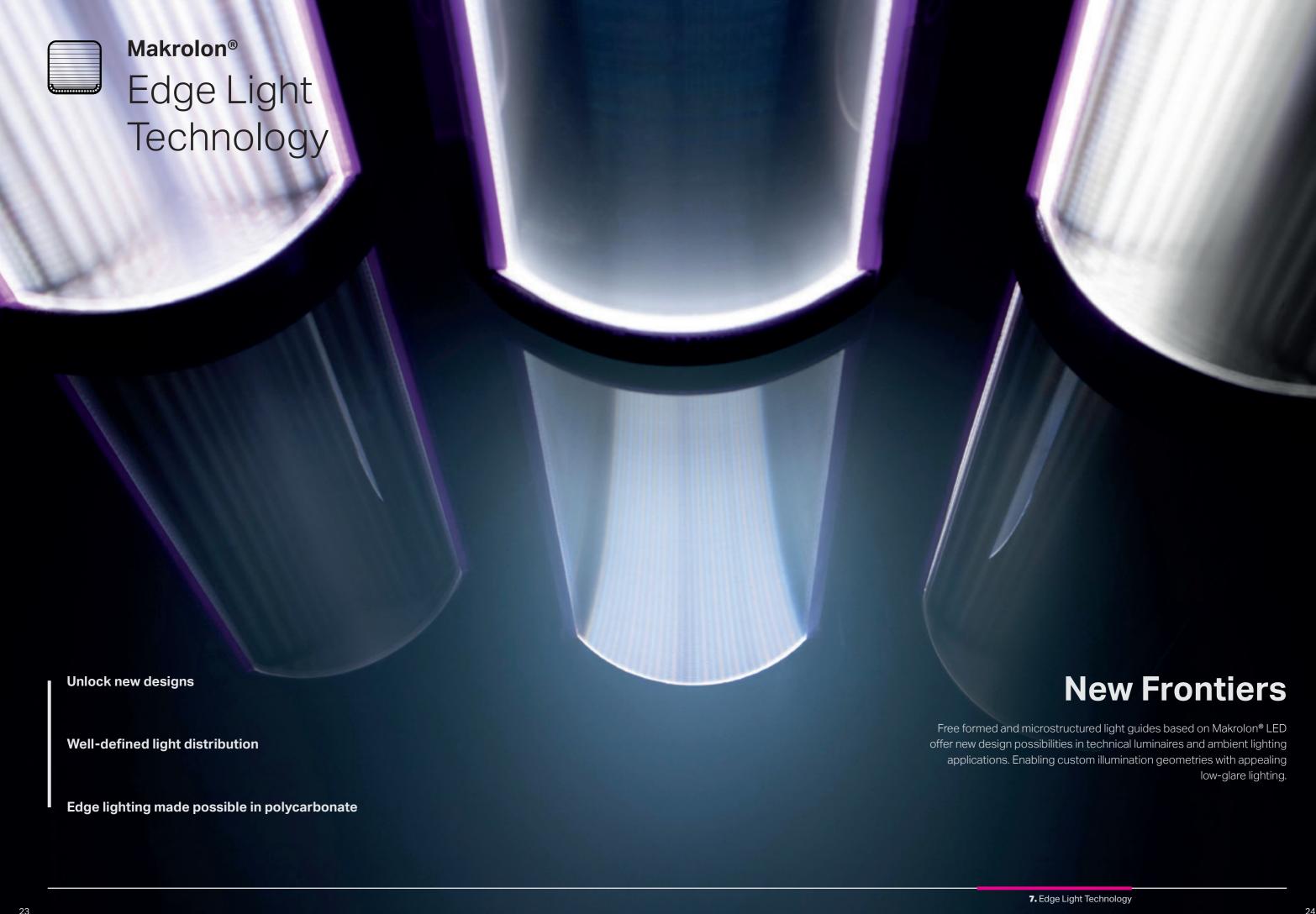
Lighten Your Experience

Makrolon® TC helps you achieve weight savings while meeting service life requirements and high efficiency.

Improve time, ergonomics and costs.

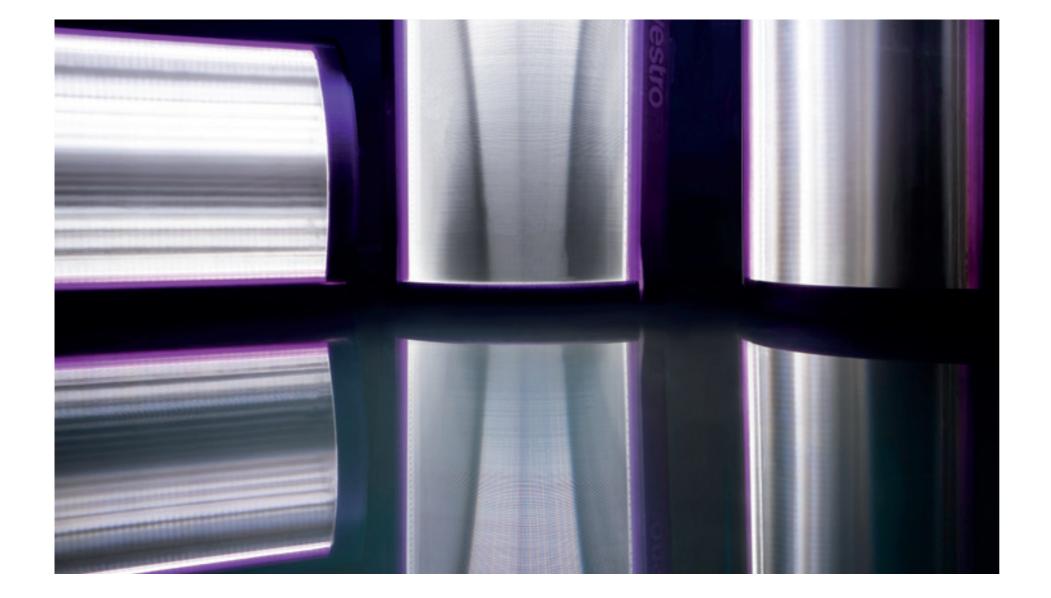
22

21



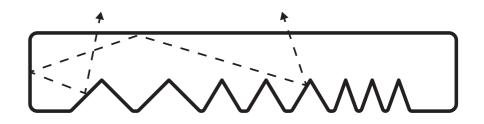






What's Your Idea?

In collaboration with our industry partners we cover all competencies that are necessary to develop an edge lighting luminaire from the idea phase to serial production. Let's work on your idea.



Schematic Illustration: Microstructed polycarbonate light guide

26

7. Edge Light Technology



Curious, Courageous and Colorful

Curious

We are open to new ideas and strive for progress. We are constantly looking for improvements. Curiosity drives us to listen closely and offer solutions that are creative and need-based.

Courageous

We see opportunities where others see risks. Where others ask "why" we answer "why not?". With our knowledge and experience we can push boundaries – always with our eyes set on the future.

Colorful

In the often dull corporate world we stand for diversity, optimism and creativity. We know that different views help to solve problems in an innovative way.

You Are Not Just a Number

At Covestro, we feel strongly about being on equal level and on the same page as our customers. We appreciate interpersonal relationships and want to listen to and evolve with you. Your competitiveness is our success.

Reliability is Our Priority

Our global presence makes us a reliable and flexible partner. Together we strive to find the right solutions for you needs.

Covestro

Our Global presence



Leverkusen

Filago

Greater Noida

Map Ta Phut

Guangzhou

PCS HQ: Shanghai

Covestro LLC 1 Covestro Circle Pittsburgh, PA 15205

USA

+1 412 413 2000

plastics@covestro.com

Covestro Deutschland AG Kaiser-Wilhelm-Allee 60 51373 Leverkusen

Germany

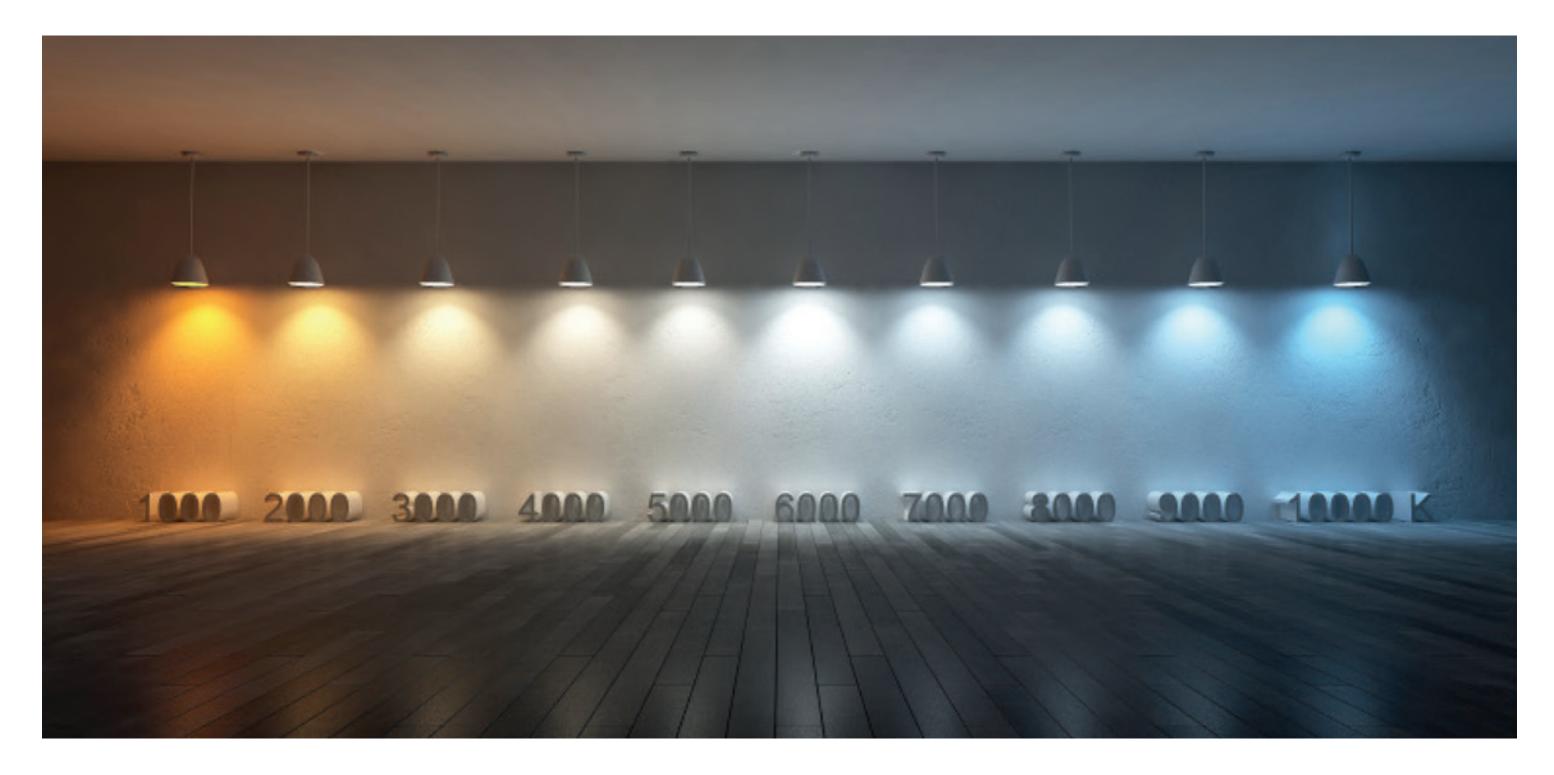
+49 214 600 92000

Covestro Polymers (China) Co. Ltd 25/F, Building 5, Crystal Plaza 36 Pingjiaqiao Rd, Pudong Shanghai 200126, P.R. China

+86 21 80207777

Covestro

Makrolon® Polycarbonate



What's Next?

The possibilities are endless. You have the ideas, we have the materials

Go ahead and start your journey with Makrolon® for LED Lighting.







Covestro Deutschland AG 51365 Leverkusen

plastics.covestro.com

This information and our technical advice - whether verbal, in writing or by ways of trial - are given in good faith but without warranty and are subject to change without notice. This also applies where proprietary rights of third parties are involved. The information is provided by Covestro AG without assumption of any liability. Our advice does not release you from the obligation to verify the information provided - especially that contained in our safety data and technical information sheets, and to check for updates of any information provided by us and to test our products as to their suitability for the intended processes and uses. The application, use and processing of our products and the products manufactured by you on the basis of our technical advise are beyond our control and, therefore, entirely your own responsibility. Our products are sold in accordance with the current version of our General Conditions of Sale and Delivery. Edition 2024 Order No.: COV00089097 Printed in Germany.